UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/508,034	06/06/2000	KARL PICHLER	C1043/7019	2505

22852 7590 06/04/2003

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP
1300 I STREET, NW
WASHINGTON, DC 20005

EXAMINER	
HODGES, MATTHEW P	
ART UNIT	**PAPER NUMBER**
2879	

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/508,034	PICHLER ET AL.	
	Examiner	Art Unit	
	Matt P Hodges	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 March 2003* .

2a)☐ This action is FINAL. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10-43 and 47-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-8,10-13,16-22 and 44-48* is/are rejected.

7)☐ Claim(s) *3,14,15,23-43 and 49* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 June 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Response to Amendment

The Amendments, filed on 03/04/2003 and 03/10/2003, have been entered and acknowledged by the Examiner.

Cancellation of claims 9 and 44-46 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 4, 5, 8, 10-13, 16-22, 47, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (US 5,798,170) in view of Decher et al. (US 5,208,111).

Regarding claims 1, 47, and 48, Zhang discloses (see figure 15) an organic light emitting device including a first electrode (16) formed on the substrate (18), second electrode (12), organic light emitting layer (14), and a polymer conductive layer (15), where the latter two layers are located between the two electrodes. (Column 5 line 57 to Column 6 line 3). Further Zhang teaches the use of glass for the composition of the substrate. (Column 10 lines 33-36) and (Column 11 lines 25-30). However Zhang does not appear to specifically state the use of a polymer layer made by process of self-assemble as the conductive layer. However Decher, in the same field of endeavor, discloses the use of polymer films formed by self assemble. This process produces ordered, defect free systems at the molecular level that can be produced at a

much higher degree of accuracy with respect to the layer thickness. This homogenous layer thickness enhances the control of the organic light emitting device and allows for less undesirable fluctuations in performance. (Column 1 lines 27-37). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the self assemble film as taught by Decher into the organic light emitting device (OLED) disclosed by Zhang in order to enhance the control and performance of the device.

Regarding claim 2, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the removal of physisorbed water from the surface of the electrode. However Decher discloses the use of methanol/toluene to remove traces of water in order to prepare the surface for a silanation reaction that prepares the surface for the self assemble process. (Column 17 lines 55-58). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the water removal from the exposed surface as disclosed by Decher into the method of fabricating an OLED as taught by Zhang in view of Decher in order to better prepare the surface for a successful self assemble.

Regarding claims 4, 5, and 22, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the formation of a coupling layer by silylating the substrate. However Decher discloses the use of silanes on the surface of the substrate after removing excess water to form a coupling layer that prepares the substrate for the first polymer layer of the self assemble process. (Column 4 lines 40-45). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the silanation of the exposed surface as disclosed by

Decher into the method of fabricating an OLED as taught by Zhang in view of Decher in order to better prepare the surface for a successful self assemble.

Regarding claim 8, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the oxidation of thiol groups to charge the surface and thus prepare it for self assemble. However Decher discloses the use of oxidizing thiol groups to leave the surface charged (Column 4 lines 47-56). Preparing charged surfaces is beneficial to advantageously allow for the immediate application of the first self assemble layer. Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the use oxidizing thiol groups as disclosed by Decher into the method of fabricating an OLED as taught by Zhang in view of Decher to advantageously allow for the immediate application of the first self assemble layer.

Regarding claim 10, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not appear to specify the use of polyester as the substrate material. However the use of polyesters interchangeable with glass as a substrate material is well known in the art of OLED construction. Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the polyester composition of the substrate into the method of fabricating an OLED as taught by Zhang in view of Decher since the selection of known materials for a known purpose is within the skill of the art.

Regarding claims 11-13, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the composition of the self assemble layer. However Decher discloses the use of bilayers composed

of positively and negatively charged particles. Each layers forming on the previous evenly and at a predetermined width due to the electrostatic attraction of the ions. (Column 3 lines 5-10).

Regarding claims 16 and 17, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the thickness of the self assemble layer. However Decher discloses the use of polymer layers 18.5 nm wide. Thin layers are advantageous for the reasons listed in the rejection of claim 1 above. (Column 12 lines 34-41). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the use of polymer layers 18.5 nm wide as disclosed by Decher into the method of fabricating an OLED as taught by Zhang in view of Decher for the same reasons as listed in the rejection of claim 1 above.

Regarding claims 18-21, Zhang further states that the luminescent layer is a semiconducting conjugated polymer or PPV. (Column 7 lines 8-12). Further the organic luminescent layer is between 10 and 100nm thick. (Column 7 lines 33-37).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (US 5,798,170) in view of Decher et al. (US 5,208,111) and further in view of Bladon (US 5,276,290).

Regarding claim 6, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the preparation of the surface to allow for surface charge attraction that is pH independent. However Bladon discloses a process of treating the surface pH in order to ensure bonding according to the surface charge attraction was pH independent. (Column 6 lines 46-48) and (Column 7 lines 1-13).

Preparing charged surfaces is beneficial to advantageously allow for the immediate application of the first self assemble layer. Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the preparation of the surface to allow for surface charge attraction that is pH independent as disclosed by Bladon into the method of fabricating an OLED as taught by Zhang in view of Decher to advantageously allow for the immediate application of the first self assemble layer.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (US 5,798,170) in view of Decher et al. (US 5,208,111) and further in view of Larm et al. (US 5,213,898).

Regarding claim 7, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the preparation of the surface to allow for surface charge attraction that is pH independent. However Larm discloses a process of quaternizing the amino groups on the substrate leaving the surface positively charged. (Column 4 lines 34-37). Preparing charged surfaces is beneficial to advantageously allow for the immediate application of the first self assemble layer. Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate quaternizing the amino groups on the substrate leaving the surface positively charged as disclosed by Larm into the method of fabricating an OLED as taught by Zhang in view of Decher to advantageously allow for the immediate application of the first self assemble layer.

Allowable Subject Matter

Claims 3, 14, 15, 23-43, and 49 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 3, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 3, and specifically comprising the limitation the use of heat to remove physisorbed water from the surface of a electrode before self assemble on that surface.

Regarding claim 14, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 14, and specifically comprising the limitation of a self assemble layer where the attraction of the bilayers is by donor/acceptor interaction.

Regarding claim 15, claim 15 is allowable for the reasons given in claim 14 because of their dependency status from claim 14.

Regarding claim 23, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 23, and specifically comprising the limitation of a OLED with a polymer layer formed by self assemble where the polymer layer has electronic or optical properties that vary with the thickness of the layer.

Regarding claims 24-43, claims 24-43 are allowable for the reasons given in claim 23 because of their dependency status from claim 23.

Regarding claim 49, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 49, and specifically comprising the limitation

of a OLED with a polymer layer formed by self assemble where the polymer layer has electronic or optical properties that vary with the thickness of the layer.

Response to Arguments

Applicant's arguments with respect to claims 1 and 22 have been considered but are moot in view of the new ground(s) of rejection.

Regarding the use of a substrate made of glass or plastics material the rejections of claims 1 and 22 have been amended to include the use of glass as a substrate material. Support for these changes can be found in the noted rejections above.

Regarding applicants claim that Decher makes no reference to light emitting devices, examiner contends that Decher is directed to the manufacture of multi-layered layer elements for use in electronic and optical purposes. Further Decher notes that the use of the layers as described are advantageous in devices where thin, defect free, adjustable, and homogenously thick layers are required. (Column 1 lines 26-33). Further one skilled in the art recognizes that maintaining a uniform thickness in the layering of OLED devices is advantageous for the control and longevity of those devices.

Regarding applicants claim that one would not have applied the multi-layered layers taught by Decher to the polymer layer as discloses by Zhang, examiner respectfully disagrees. The conductive layer discloses by Zhang is central to the enhanced longevity of the OLED device. Further controlling the resistance and thus thickness of the conductive layer is important to minimize the voltage drop through the conductive layer (Column 9 lines 15-25). Therefore the enhanced control provided by Decher in the manufacture of polymer layers would be

beneficial in the device as taught by Zhang for the reasons given in the rejection of claims 1, 22, and 48 above.

As allowable subject matter has been withdrawn in this office action the action has been made non-final.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matt P Hodges whose telephone number is (703) 305-4015. The examiner can normally be reached on 7:30 AM to 4:00 PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703) 305-4794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

mph
May 29, 2003

VIP PATEL
PRIMARY EXAMINER